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Claims:

1.   A method of identifying and quantifying information from a molten phase product having an exposed surface area, the method comprising the

5   steps of

a)   developing a standard for on-line evaluation of digital images and

b)   performing said evaluation on-line, in which the standard is developed using the following steps:

i)   taking a digital image of an exposed surface area of a molten

10   phase product to produce a standard image data;

ii)   performing principal component analysis on the standard image data to define score vectors t_1 and t_2 characterizing the standard image data;

iii)   correlating values of the score vectors t_1 and t_2 with

15   characterizing properties of the molten phase product to define standard values of t_1 and t_2;

and the evaluation is performed using the following steps:

iv)   taking a digital image of an exposed surface area of a molten phase product to produce on-line image data;

20   v)   performing principal component analysis on the on-line image data to define score vectors t_1 and t_2 characterizing the on-line image data;

vi)   assigning a characterizing property to areas of the on-line image data according to said standard values of t_1 and t_2; and

25   viii)   creating an output of said characterizing property whereby phases are identified and quantified.

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2.   Method according to Claim 1 in which the molten phases include any one of the following: slag, flux, metal, matte, and glass.

3.   Method according to Claim 1 in which the digital image is taken in the visible spectrum.

4.   Method according to Claim 1 in which the digital image consists of an array of pixel elements of measured intensity values in at least three wavelength ranges.

5.   Method according to Claim 4 in which the pixel elements of the digital image have varying intensities of the colours red, green, and blue.

6.   Method according to Claim 1 in which the characterizing property which is corrected with the score vectors t_1 and t_2 is selected from the following group: phase identification of molten phase product; surface area occupied by each identified phase; temperature of each identified phase.

7.   A method of monitoring a steelmaking ladle having high temperature molten phases to discriminate between areas of the ladle having any bare metal, bare metal covered with slag and fluid slag, the method comprising the steps of:

a)   developing a standard for on-line evaluation of digital images and

b)   performing said evaluation on-line, in which the standard is developed using the following steps:

      i)   taking a digital image of an exposed surface area of a steelmaking ladle to produce a standard image data;

ii)   performing principal component analysis on the standard image data to define score vectors t_1 and t_2 characterizing the standard image data;

iii)   correlating values of the score vectors t_1 and t_2 with characterizing properties of the molten phase product to define standard values of t_1 and t_2;

and the evaluation is performed using the following steps:

iv)   taking a digital image of an exposed surface area of a molten phase product to produce on-line image data;

v)   performing principal component analysis on the on-line image data to define score vectors t_1 and t_2 characterizing the on-line image data;

vi)   assigning a characterizing property to areas of the on-line image data according to said standard values of t_1 and t_2; and

viii)   creating an output of said characterizing property whereby phases are identified and quantified.

8.   Method according to Claim 7 in which the characterizing property which is corrected with the score vectors t_1 and t_2 is selected from the following group: phase identification; surface area occupied by each identified phase; temperature of each identified phase.